

FINAL
Examination Paper

(COVER PAGE)

Session : APRIL 2017

Programme : Diploma In Information And Communication Technology (DICTN)
Diploma In Mechanical Engineering (DMEN)
Diploma In Electronic And Electrical Engineering (DEEE)
Diploma In Mass Communication (DMCN)

Course : ICT1101: Program Logic Formulation

Date of Examination : 31 July, 2017 (Monday)

Time : 8:00am – 10:00am Reading Time : Nil

Duration : 2 Hours

Special Instructions :

SECTION A: Answer ALL multiple choice questions.

SECTION B: Answer any THREE (3) essay questions.

IMPORTANT NOTE : THIS PAPER SHOULD NOT BE TAKEN OUT OF THE
EXAMINATION HALL

Materials permitted : Nil

Materials provided : OMR Sheets

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Moderator : Pawani T Rasaratnam

This paper consists of 10 printed pages, including the cover page

DIPLOMA IN INFORMATION AND COMMUNICATION TECHNOLOGY (DICTN)
DIPLOMA IN MECHANICAL ENGINEERING (DMEN)
DIPLOMA IN ELECTRONIC AND ELECTRICAL ENGINEERING (DEEI)
DIPLOMA IN MASS COMMUNICATION PROGRAMME (DMCN)
ICT1101: PROGRAM LOGIC FORMULATION
FINAL EXAMINATION: APRIL 2017 SESSION

SECTION A: (40 marks)

Instruction: This section consists of **TWENTY (20)** questions. Answer **ALL** questions in the OMR sheet provided.

1. Which of the following problem solving tools is the best tool to view pseudocode?

- A. Flowchart
- B. Algorithm
- C. Problem Analysis Chart
- D. Data Dictionary

2. What is the possible output printed from statement below?

```
total = 2 * ( 1 \ 2 * 3) - 1  
Display total
```

- A. -1
- B. -0.6
- C. 1
- D. 2

3. Which one of the following problems must be solved with heuristic solutions?

- A. Providing directions to the nearest McDonald's.
- B. Identifying which student has the highest marks in the exam.
- C. Choosing which stocks to buy that will provide the largest profit.
- D. Selecting the cheapest phone to buy from a store.

4. _____ means that all of the decisions are processed sequentially.

- A. Nested IF/THEN/ELSE instruction
- B. Straight-through logic
- C. Positive logic
- D. Negative logic

5. Which of the following data items shall be assigned to string data type ?

- I. A car plate number
- II. Product number
- III. Contact Number
- IV. Number of students in a class

- A. I and III only
- B. II and IV only
- C. I, II and III only
- D. I, II, III and IV

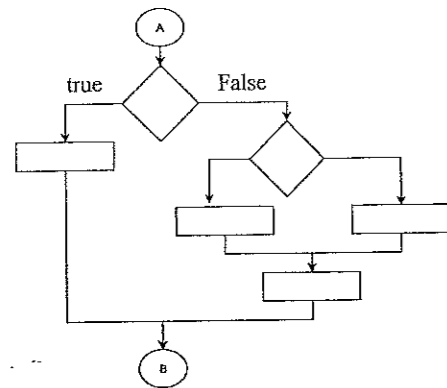
6. What is the final value of X and Y for the following instructions ?

```

X = 5
Y = 4
X = X + Y
Y = X*2
X = Y
    
```

- A. X=5, Y = 4
- B. X=9, Y =18
- C. X=18, Y = 18
- D. None of the above

7. Identify the type of logic structure for the following flowchart:



- A. case logic
- B. Straight-through logic
- C. Positive logic
- D. Negative logic

8. Which one of the following statements are TRUE?

- I. A constant is a specific alphabetic or numeric value that never changes during processing of instructions in a solution.
- II. A variable's name helps to find the memory location that stores the value of a particular data type.
- III. Constants are also known as identifiers in some languages.
- IV. A constant's value can be changed during the execution of a program.

- A. I and II only
- B. II and IV only
- C. II, III and IV only
- D. III and IV only

9. By using the _____ rather than the nested If/Then/Else alternative, a programmer can improve the readability and reduce the complexity of the program.

- A. case logic
- B. Straight-through logic
- C. Positive logic
- D. Negative logic

10. Which one of the following data types is **INCORRECT**?

- A. Numeric – 56.9
- B. Character – '@'
- C. String – "Hello, World!"
- D. Logical – AND/OR

11. Based on the following algorithm, given the value of X = 2 and Y = 3, what is the value of Z?

```
Z = 1.25
Case Of X+Y
=10: Z = 0
=15: Z = 4.65
=20: Z = 7.85
OTHERWISE: DISPLAY "Error"
End-of-case
```

- A. 0
- B. 1.25
- C. 4.65
- D. 7.85

12. Identify the most suitable logic structure to solve the following problem:

Bob wants to decide if he wants to buy a Proton Saga or a Perodua Myvi. He wants to buy the cheapest option. Currently Proton Saga (RM20,000) is having a 30% discount whereas Perodua Myvi (RM30,000) is having a 30% discount. Write a solution to calculate the price for the cars and print the name of the cheapest car.

- A. Sequential logic
- B. Repetition logic
- C. Decision logic
- D. Case logic

13. Translate the following expression into a logical statement:

The car price is in between 10000 to 90000 inclusive

- A. $\text{CarPrice} \geq 10000 \text{ AND } \text{CarPrice} \leq 90000$
- B. $\text{CarPrice} > 10000 \text{ AND } \text{CarPrice} < 90000$
- C. $\text{CarPrice} \geq 10000 \text{ OR } \text{CarPrice} \leq 90000$
- D. $\text{CarPrice} > 10000 \text{ OR } \text{CarPrice} < 90000$

14. _____ loop in which a variable is set equal to a given number and increases in equal given increments until it is greater than an ending number.

- A. Pre-condition
- B. Post-condition
- C. Automatic-counter
- D. Nested loop

15. Based on the following algorithm, what is the final value of y ?

```
x = -1
y = 0

WHILE x < 4
    y = y + 2
    x = x + 1
END WHILE
```

- A. 6
- B. 8
- C. 10
- D. 12

16. The variable uses to calculate the multiplication of a series of positive numbers must be initialized to _____.

- A. 0
- B. 1
- C. Any positive numbers
- D. Any negative numbers

17. Assume counter is an integer variable, how many times the Print counter instruction is processed?

```
LOOP : counter = 0 to 5 STEP 1
      Print counter
LOOP-END : counter
```

- A. 3
- B. 4
- C. 5
- D. 6

18. The following are the characteristics of local variables except _____.

- A. They are declared in a module.
- B. Their values can be used and changed by any module in the program.
- C. The variables will be deleted from computer memory when its module ends.
- D. Their variable name can be the same as other local variables in different modules.

19. Given the following instructions:

```
IF X + 1 < 3 THEN
  Y = 10
ELSE
  IF X < 7 THEN
    Y = 15
  ELSE
    Y = 20
  END-IF
END-IF
```

Which of the following statement is **INVALID**?

- A. If X = 2, then 10 will assigned to Y at the end of the algorithm.
- B. If X= 5, then the instruction Y=15 will be executed.
- C. Value of X is remain the same throughout the whole algorithm
- D. The algorithm demonstrated an example of positive decision logic

20. Which of the following is **FALSE** about programming languages?

- A. High-level language must be translated into machine language before execution.
- B. Assembly language is the native tongue of computers.
- C. Machine language represents data and operations in binary strings.
- D. C++ is an example of high-level programming language

SECTION B: (60 marks)

Instruction: This section consists of **FOUR (4)** questions. Answer any **THREE (3)** questions in the answer booklet provided.

Question 1

(a) Solve the following expression and show the full working of your answer:

$$3+4/2*3<7*2-3 \text{ OR } 7+9/3+5*2<=1*4/2+8$$

(5 marks)

(b) Convert the following mathematics expression into computer expression:

i) $E = \frac{2}{B} \times 11A + 42 \div C$

ii) $E = \frac{(bx)^a}{7c} + \sqrt[3]{2d}$

(5 marks)

(c) At INTI Bank, a customer will receive special interest rate based on customer's type of account (personal or business), level (Standard or Gold) and bank account balance. Design a solution to calculate amount of interest that they will receive. Present your answer in problem Analysis Chart (PAC). The interest rate will be as follows:

| Type of Account | Level | Balance (minimum) | Special Interest Rate |
|-----------------|----------|-------------------|-----------------------|
| Personal | Standard | \$ 1000 | 1.3% |
| Personal | Gold | \$ 3000 | 1.6% |
| Business | Standard | \$ 5000 | 2.2% |
| Business | Gold | \$ 15000 | 2.5% |

(10 marks)

Question 2

(a) Construct a truth Table for the following logical expression :

$$X = \text{NOT } B \text{ AND } A \text{ OR NOT } A \quad (8 \text{ marks})$$

(b) Design a solution using case logic structure to calculate total fare for upcoming musical theater. The solution shall ask user for the ticket type code, and ticket quantity. Display appropriate error message if ticket type code is invalid. You should use the following table, as the structure to calculate total fare. Each purchase is subjected to 6% Goods and Service Tax (GST). Present your solution in flowchart.

| Ticket Type | Ticket Type Code | Ticket Price (\$) |
|----------------|------------------|--------------------------|
| Kids | K | 15.50 |
| Adult | A | 25.50 |
| Senior Citizen | S | Entitle for 50% discount |

(12 marks)

Question 3

(a) Outline **THREE (3)** differences between a compiler and an interpreter.

(6 marks)

(b) For the following operators, identify the correct operator to convert from positive logic to negative logic or vice versa:

- (i) ==
- (ii) >
- (iii) <=
- (iv) Or

(4 marks)

(c) "All case logic structures can be rewrite into decision logic structure however vice versa is not always possible."

Do you agree with the above statement? Provide reasons to support your answer.

(5 marks)

(d) Convert the following case logic structure into decision logic structure :

```

Case of code mod 4
= 0: Display code, " is in Group A"
= 1: Display code, " is in Group B"
= 2: Display code, " is in Group C"
= 3: Display code, " is in Group D"
End-of-case
    
```

(5 marks)

Question 4

(a) Differentiate while/while-end loop and repeat/until loop.

(4 marks)

(b) Design solution using repetition logic to display the appropriate role of 30 status entered by user:

| <u>Status</u> | <u>Role</u> |
|-------------------------------|---------------------|
| \$ | Status as student |
| # | Status as employee |
| * | Status as president |
| Others input than \$, # and * | Errors |

(8 marks)

(c) Draw a coupling diagram for the following problem:

Write the *InputData* module to read radius of two circles.

Write the *CalcData* module to calculate the area of two circles respectively based on the radius of two circles.

Write the *FindBiggest* module to determine the biggest circle based on the radius of the respectively circle.

Write the *Output* module to display which circle is biggest and its respectively area calculated in *CalData* module.

(8 marks)